

WHAT IS CLAIMED IS:

1. A plasma etching gas suitable for etching a silicon layer in a silicon oxide etching device, the plasma etching gas comprising:

a fluoro-alkane gas; and

5 a nitrogen gas.

2. The plasma etching gas of claim 1, wherein a flow rate of the nitrogen is about 1 sccm to about 50 sccm.

3. The plasma etching gas of claim 1, wherein the fluoro-alkane is selected from a group consisting of CF_4 , C_2F_6 , C_3F_8 , C_4F_8 , CH_3F , CHF_3 and CH_2F_2 .

10 4. The plasma etching gas of claim 1, further comprising an argon gas.

5. The plasma etching gas of claim 4, wherein a flow rate of the argon gas is about 50 sccm to about 150 sccm.

6. A plasma etching gas suitable for etching a silicon layer in a silicon oxide etching device, the plasma etching gas comprising:

15 a partially fluoro-substituted alkane gas;

a fully fluoro-substituted alkane gas; and

a nitrogen gas.

7. The plasma etching gas of claim 6, wherein a flow rate of the nitrogen is about 1 sccm to about 50 sccm.

8. The plasma etching gas of claim 6, wherein the fully fluoro-substituted alkane is selected from a group consisting of CF_4 , C_2F_6 , C_3F_8 and C_4F_{10} .

5 9. The plasma etching gas of claim 1, wherein the partially fluoro-substituted alkane gas is selected from a group consisting of CH_3F , CHF_3 and CH_2F_2 .

10. The plasma etching gas of claim 6, wherein the partially fluoro-substituted alkane gas is CHF_3 , and the fully fluoro-substituted alkane gas is CF_4 .

10 11. The plasma etching gas of claim 10, wherein a ratio of CHF_3 to CF_4 is about 3/1 to about 15/1.

12. The plasma etching gas of claim 10, wherein a flow rate of the nitrogen is about 1 sccm to about 50 sccm.

13. The plasma etching gas of claim 10, further comprising an argon gas.

15 14. The plasma etching gas of claim 13, wherein the flow rate of the argon gas is in the range of about 50 sccm to about 150 sccm.

15. The plasma etching gas of claim 6, wherein a ratio of CHF_3 to CF_4 is about 3/1 to about 15/1.

16. The plasma etching gas of claim 6, further comprising an argon gas.

17. The plasma etching gas of claim 16, wherein flow rate of the argon gas is about 50 sccm to about 150 sccm.

18. A method of producing a semiconductor device, comprising:

providing a substrate;

5 forming an oxide layer on the substrate;

providing an etching gas consisting of fluoro-alkane gas and nitrogen gas; and

etching the oxide layer by using the etching gas.

19. The method of claim 18, wherein a flow rate of the nitrogen gas is about 1 sccm to about 50 sccm.

10 20. The method of claim 18, wherein the fluoro-alkane is selected from a group consisting of CF_4 , C_2F_6 , C_3F_8 , C_4F_8 , CH_3F , CHF_3 and CH_2F_2 .

21. The method of claim 18, wherein the etching gas further comprises an argon gas.

15 22. The method of claim 21, wherein flow rate of the argon gas is about 50 sccm to about 150 sccm.